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| **TOPIC: Equations and Inequalities** | | | | Semester this  will be taught: Fall |
| **Enduring Understanding:** | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| **Strand 1: Number Sense and Operations**  **Concept 2: Numerical Operations** | ***PO 1. Explore different forms of complex numbers; determine if the properties of the real number system extend to complex numbers and matrices.***  ***PO 2. Perform computations with complex numbers.*** | What does solving for the variable really mean?  How are inverse operations used to solve equations?  How are the solutions of an equation related to the graph of the functions? | Ch 1.1 – 1.3  Ch 1.4 (complete the square as in Ch. 3.1)  Ch 1.5 – 1.8 |  |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 2: Functions and Relationships** | ***PO 1. Express and solve problems that can be modeled using linear, quadratic, logarithmic, exponential, cubic, reciprocal, absolute value, and step and other piecewise-defined functions; interpret their solutions in terms of the context.***  ***PO 7. Find domain, range, intercepts, zeros, asymptotes, and points of discontinuity of functions.*** |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 3: Algebraic Representations** | ***PO 1. Rewrite and describe the need for equivalent forms of algebraic expressions.***  *HS PO 6. Solve Linear inequalities in one variable*  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |

**Key Concepts: Key Vocabulary:**

**Examples:**

**Essential Question(s):**

What does solving for the variable really mean?

How are inverse operations used to solve equations?

How are the solutions of an equation related to the graph of the functions?

**Enduring Understanding:**

The ability to solve equations and inequalities, allows one to find an unknown quantity.

Interval Notation

Linear Inequality

Imaginary Unit

Complex Number

Standard Form

Quadratic Inequality

TOPIC:

**Equations & Inequalities**

We can find solutions to real world problems by modeling with linear equations and inequalities.

Complex numbers are used to model numerous aspects of the natural world.

A variety of methods are can be used to solve quadratic equations.

Quadratic and Absolute Value inequalities produce a range of answers, not one specific answer.

Solve & write in interval notation.





Simplify:



Solve.











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| **TOPIC: Graphs and functions** | | | | Semester this  will be taught: Fall |
| **Enduring Understanding:** All equations correlate to a graph with unique characteristics. | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions**  How can you tell that the graph you have matches an equation?  What is the process to find an inverse equation?  When is a function one-to-one?  What is a piecewise function?  How could you find the composition of 2 functions? | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 2: Functions and Relationships** | ***PO 1. Express and solve problems that can be modeled using linear, quadratic, logarithmic, exponential, cubic, reciprocal, absolute value, and step and other piecewise-defined functions; interpret their solutions in terms of the context.*** | Ch 2.3 – 2.8 |  |
| ***PO 2. Use function notation flexibly and evaluate a function at a value represented by an algebraic expression.*** |
| ***PO 3. Graph absolute value, and step and other piecewise-defined functions identifying their key characteristics.*** |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 4: Analysis of Change** | ***PO 1. Analyze and describe how a change in an independent variable leads to a change in a dependent variable.***  ***PO 2. Identify patterns in a function’s rate of change, including intervals of increase, decrease, and constancy; if possible, relate them to the function’s verbal description or its graph.***  ***PO 4. Compare relative magnitudes of functions and their rates of change.*** |
| **Strand 2: Data Analysis, Probability, and Discrete Mathematics**  **Concept 1: Data Analysis** | ***PO 8. Draw a line of best fit for a scatterplot with or without technology, describe how the correlation coefficient relates to fit, and explain when it is appropriate to use the regression equation to make predictions.*** |
|  | See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |

**Key Concepts: Key Vocabulary:**

A function is a relation where each x value has exactly one y value.

Understanding a function’s domain and range is fundamental to understanding its behavior.

Linear functions can be written in various forms, each with its particular benefits and limitations.

Combinations and compositions of functions can sometimes help us understand the “big picture”, or the relationship between multiple functions.

Understanding the graphs of common parent functions allows us to produce shifts, stretches, and reflections with relative ease.

X- And Y- Intercepts

Dependent Variable

Independent Variable

Relation Function

Domain

Range

Increasing

Decreasing

Piece-Wise Defined

Find ‘r’ so that the line through  is

1. Parallel to
2. Perpendicular to 

**Examples:**

**Essential Question(s):**

How can you tell that the graph you have matches an equation?

What is the process to find an inverse equation?

When is a function one-to-one?

What is a piecewise function?

How could you find the composition of 2 functions?

**Enduring Understanding:**

All equations correlate to a graph with unique characteristics.

TOPIC:

**Graphs and Functions**

Graph: 



Given 

Evaluate and give domain & range: ;



Find Domain & Range:



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| **TOPIC: Polynomial and Rational functions** | | | | Semester this  will be taught: \_Fall |
| **Enduring Understanding:** | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| **Strand 1: Number Sense and Operations**  **Concept 2: Numerical Operations** | ***PO 1. Explore different forms of complex numbers; determine if the properties of the real number system extend to complex numbers and matrices.***  ***PO 2. Perform computations with complex numbers.*** | Do asymptotes ever touch the graph?  How do you determine *x*-intercepts given a higher order polynomial?  What key characteristics of an equation are needed to graph? | Ch 3.1 – 3.5 |  |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 2: Functions and Relationships**  **Concept 3: Algebraic Representations**  **Concept 4: Analysis of Change** | ***PO 1. Express and solve problems that can be modeled using linear, quadratic, logarithmic, exponential, cubic, reciprocal, absolute value, and step and other piecewise-defined functions; interpret their solutions in terms of the context.***  ***PO 2. Use function notation flexibly and evaluate a function at a value represented by an algebraic expression.***  ***PO 6. Graph polynomial functions identifying their key characteristics***  ***PO 7. Find domain, range, intercepts, zeros, asymptotes, and points of discontinuity of functions.***  ***PO 1. Rewrite and describe the need for equivalent forms of algebraic expressions.***  ***PO 2. Apply the laws of exponents including rational and negative exponents to rewrite expressions in alternative forms***.  ***PO 6. Divide a polynomial by a lower degree polynomial***  ***PO 7. Find complex solutions for quadratic equations.***  ***PO 8. Describe the relationships among the solutions of an equation, the zeros of a function, the x-intercepts of a graph, and the factors of a polynomial expression with and without technology.***  ***PO 2. Identify patterns in a function’s rate of change, including intervals of increase, decrease, and constancy; if possible, relate them to the function’s verbal description or its graph.*** |
| **Strand 4: Geometry and Measurement**  **Concept 2: Transformation of Shapes** | ***PO 1. Describe how changing the parameters of a quadratic function affects the shape and position of its graph (f(x) = a(x-h)2+k).***  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |

**Key Concepts: Key Vocabulary:**

Polynomial

Quadratic

Vertex

Axes

Synthetic Division

Zeros

Roots

Turning Points

End Behavior

Asymptotes

Graph, find intercepts, axis of symmetry, as well as find domain and range of the following function. 

TOPIC:

**Polynomial and Rational Functions**

Find ALL zeros.



Graph and identify any asymptotes.



Graph the polynomial by determining the end behavior and finding all intercepts.

**Examples:**

**Essential Question(s):**

Do asymptotes ever touch the graph?

How do you determine x intercepts given a higher order polynomial?

What key characteristics of an equation are needed to graph?

**Enduring Understanding:**

Knowing the characteristics of an equation, leads to solving and graphing.

A variety of methods are needed to accurately graph more complicated polynomials.

Synthetic division can help us find or verify the zeros of a polynomial function.

The graphs of the function can be found by considering the effects of the constants a, h, and k on the graph.

End behaviors and local extrema determine the shape of the graph.

Graphing rational equations requires the ability to find asymptotes and intercepts.

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| **TOPIC: Inverse, Exponential, and Logarithmic Functions** | | | | Semester this  will be taught: Spring |
| **Enduring Understanding:** | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 2: Functions and Relationships** | ***PO 1. Express and solve problems that can be modeled using linear, quadratic, logarithmic, exponential, cubic, reciprocal, absolute value, and step and other piecewise-defined functions; interpret their solutions in terms of the context.***  ***PO 2. Use function notation flexibly and evaluate a function at a value represented by an algebraic expression.***  ***PO 4. Graph exponential functions identifying their key characteristics***  ***PO 10. Given a function***   * ***find the inverse of the function,*** * ***determine whether the inverse is a function,*** * ***explain why the graph of a function and its inverse are reflections of each other over the line y = x.***   ***PO 14. Combine functions by composition, as well as by addition, subtraction, multiplication, and division including any necessary restrictions on the domain*** | How do you solve an equation when the variable is in the exponent position?  What strategies can be used to solve a logarithmic equation?  When do you solve with logs as opposed to natural logs? | Ch 4.1 – 4.6 |  |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 3: Algebraic Representations** | ***PO 1. Rewrite and describe the need for equivalent forms of algebraic expressions.***  ***PO 2. Apply the laws of exponents including rational and negative exponents to rewrite expressions in alternative forms***.  ***PO 5. Simplify radical expressions by performing operations on them.*** |
| **Strand 4: Geometry and Measurement**  **Concept 2: Transformation of Shapes** | ***PO 2. Describe how changing the parameters of an exponential function affects the shape and position of its graph (f(x) = abx).***  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |

**Key Concepts: Key Vocabulary:**

One To One

Inverse

Exponential Function

Logarithmic Function

Common Log

Natural Log

Compound Interest

Future Value

Present Value

TOPIC:

**Inverse, Exponential, and Logarithmic Functions**

Find the inverse of



Solve.



**Examples:**

**Essential Question(s):**

How do you solve an equation when the variable is in the exponent position?

What strategies can be used to solve a logarithmic equation?

When do you solve with logs as opposed to natural logs?

**Enduring Understanding:**

Knowing the properties of exponential and logarithmic equations allows a more thorough and accurate solution.

Inverse functions can be verified by using composition of functions.

The value of *a* for the function, *f*(x) = *a*x, is used to determine if the function represents growth or decay.

The parameters of an exponential function describe the effects and shapes of its graph.

Logarithmic functions have unique properties that are used to simplify or convert an equation.

Logarithms can be expressed in any number of bases, but a natural log in terms of the natural number e.

For any amount of money invested at annual interest, compounded continuously, how long will it take for your money to triple?

Solve.

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| **TOPIC: Trigonometric Functions** | | | | | Semester this  will be taught: Spring |
| **Enduring Understanding:** Trigonometry can be used to find lengths of sides and angle measure of both right triangles and regular triangles. Trigonometric equations or expressions are verified with identities. Radians are comparable to degrees of an angle in the trigonometric unit circle. Use trigonometry to solve real world situations. | | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** |  | **Essential Questions**  **Assessments** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| Strand 4: Geometry and Measurement  Concept 3: Coordinate Geometry | PO 5. Evaluate all six trigonometric functions at angles between (0 degrees and 360 degrees, 0 and 2π radians) using the unit circle in the coordinate plane. |  | What is the relationship between radians and degrees?  How do you find the missing sides and angles of a triangle?  What are some real world applications of triangle measurement? | Ch 5.1 – 5.4 |  |
| Strand 4: Geometry and Measurement  Concept 4: Measurement | PO 1. Explain, use, and convert between degree and radian measures for angles. |
|  | See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |  |

**Key Concepts: Key Vocabulary:**

If the point (-2,-3) is on the terminal side of angle θ in standard position. Find the 6 trig ratios of θ.

TOPIC:

**Trigonometric Functions**

Find the exact value of 

**Examples:**

**Essential Question(s):**

What is the relationship between radians and degrees?

How do you find the missing sides and angles of a triangle?

What are some real world applications of triangle measurement?

**Enduring Understanding:**

Trigonometry can be used to find lengths of sides and angle measure of both right triangles and regular triangles.

Vertex

Initial Side

Terminal Side

Angle

Degree

Sine

Cosine

Tangent

Reference Angle

Angle of Elevation

Angle of Depression

Bearing

Basic trig identities can be used to solve equations and problems.

The relationship between the sides of a right triangle determine the 6 trig functions.

Find the remaining trig functions for each angle θ.



Solve the right triangle ABC, if a=29.43cm, and c=53.58cm.

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| **TOPIC: Circular Functions and their graphs** | | | | | Semester this  will be taught: Spring |
| **Enduring Understanding:** Trigonometry can be used to find lengths of sides and angle measure of both right triangles and regular triangles. Trigonometric equations or expressions are verified with identities. Radians are comparable to degrees of an angle in the trigonometric unit circle. Use trigonometry to solve real world situations. | | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** |  | **Essential Questions**  **Assessments** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| Strand 4: Geometry and Measurement  Concept 2: Transformations of shapes | PO 3. Describe how changing the parameters of a trigonometric function affects the shape and position of its graph (*f(x) = A sin B(x-C)+D* or the other trigonometric functions). |  | What position in an equation allows the graph to shift, condense, or expand?  How do you convert from degrees to radians and vice versa?  How do you determine a trig value from the unit circle? | Ch 6.1 – 6.4 |  |
| Strand 4: Geometry and Measurement  Concept 3: Coordinate Geometry | PO 4. Graph all six trigonometric functions identifying their key characteristics. |
|  | See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |
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**Key Concepts: Key Vocabulary:**

TOPIC:

**Circular Functions and Their Graphs**

Convert to radians.

**Examples:**

Radians

Sector Of A Circle

Unit Circle

Sine Wave

Cosine Wave

Period

Phase Shift

Amplitude

Trig Functions

Knowledge of both degrees and radians is necessary to understanding circles.

The unit circle gives us a unique perspective and method for handling common angles with ease.

The unit circle is directly related to the graphs of sine and cosine.

Amplitude, phase shift, and period are needed to translate the sine or cosine graph.

**Enduring Understanding:**

Radians are comparable to degrees of an angle in the trigonometric unit circle.

**Essential Question(s):**

What position in an equation allows the graph to shift, condense, or expand?

How do you convert from degrees to radians and vice versa?

How do you determine a trig value from the unit circle?

Find the exact value of 

Graph.





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| **TOPIC: Trigonometric Identities and equations** | | | | | | Semester this  will be taught: \_Spring | |
| **Enduring Understanding:** Trigonometry can be used to find lengths of sides and angle measure of both right triangles and regular triangles. Trigonometric equations or expressions are verified with identities. Radians are comparable to degrees of an angle in the trigonometric unit circle. Use trigonometry to solve real world situations. | | | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** | |
| Strand 4: Geometry and Measurement  Concept 1: Geometric Properties | PO 4. Use basic trigonometric identities including Pythagorean, reciprocal, half-angle and double-angle, and sum and difference formulas to solve equations and problems.  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |  | How can the Pythagorean Identities be used to simplify a trigonometric expression or equation? | Ch 7.1, 7.2,  Ch 7.5 – 7.7 | |  | |

**Key Concepts: Key Vocabulary:**

TOPIC:

**Trigonometric Identities and Equations**

Write in terms of sin and cos.



**Examples:**

Reciprocal Identities

Pythagorean Identities

Trig identities verify and simplify equations and expressions.

Trigonometric equations can be solved using similar methods from linear and quadratic equations and appropriate inverse operations.

**Enduring Understanding:** Trigonometric equations or expressions are verified with identities.

**Essential Question(s):**

How can the Pythagorean Identities be used to simplify a trigonometric expression or equation?

Verify the following.



Solve .On the Interval 



Graph.



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| **TOPIC: Applications of Trigonometry** | | | | | Semester this  will be taught:Spring |
| **Enduring Understanding:** Trigonometry can be used to find lengths of sides and angle measure of both right triangles and regular triangles. Trigonometric equations or expressions are verified with identities. Radians are comparable to degrees of an angle in the trigonometric unit circle. Use trigonometry to solve real world situations. | | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| Strand 4: Geometry and Measurement  Concept 1: Geometric Properties | PO 3. Apply the law of cosines and the law of sines to find missing sides and angles of triangles.  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |  | Does the answer to the equation make sense, in the context you are solving?  How do you set up the trig equation to describe a variety of situations? | Ch 8.1, 8.2 |  |
|  |

**Key Concepts: Key Vocabulary:**

Recognizing the situation that creates the ambiguous case is necessary to finding the correct triangle.

The laws of sine and cosine can be used to find missing angles and/or sides. Each require their own unique side and angle relationships.

Heron’s formula can be used to find the area of non-right triangles.

Solve the triangle (if it exists).



Topic:

**Applications of Trigonometry**

**Examples:**

**Essential Question(s):**

Does the answer to the equation make sense, in the context you are solving?

How do you set up the trig equation to describe a variety of situations?

**Enduring Understanding:**

Use trigonometry to solve real world situations.

Law of Cosines

Law of Sines

Ambiguous Case (SSA)

Oblique Triangle

Side-Angle-Side

Angle-Side-Angle

Side-Side-Side

Side-Side-Angle

Solve the triangle (if it exists).



Solve the triangle (if it exists).

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| **TOPIC: Systems and Matrices** | | | | Quarter this  will be taught:Fall |
| **Enduring Understanding:** A matrix helps solve for multiple variables in a system of equations. | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| **Strand 2: Data Analysis, Probability, and Discrete Mathematics**  **Concept 1: Data Analysis** | ***PO 9. Use matrices to organize and represent data.*** | How can you distinguish between rows and columns?  How can you set up a matrix given multiple equations? | Ch 9.1 – 9.3  Ch 9.5, 9.7, 9.8 |  |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 3: Algebraic Representations** | ***PO 3. Solve systems of three linear equations in three variables with or without technology***  ***PO 4. Use matrices to represent everyday problems that involve systems of linear equations.***  ***PO 9. Use matrix operations and the inverse of a matrix to solve problems.*** |
| **Strand 4: Geometry and Measurement**  Concept 3: Coordinate | ***PO 1. Graph the solution set of a system of two or three linear inequalities and given an ordered pair determine whether it is a solution to the system.***  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |

**Key Concepts: Key Vocabulary:**

Solve the system. 

TOPIC:

**Systems and Matrices**

**Examples:**

**Essential Question(s):**

How can you distinguish between rows and columns?

How can you set up a matrix given multiple equations?

What method is used to solve for 3 variables?

**Enduring Understanding:**

A matrix helps solve for multiple variables in a system of equations.

Consistent

Inconsistent

Dependent

Independent

Ordered Triple

Matrix

Determinant

Minors

Co-Factors

Non-Linear System

Half Plane

Boundary

Inverse Matrix

The elimination and substitution methods are used to find the intersection point (or lack thereof) between two lines.

Systems of equations can be represented and solved with matrices.

Find the inverse.



Solve the non-linear system both algebraically and graphically.





Graph the solution set.





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| **TOPIC:** Further Topics in Algebra | | | | Semester this  will be taught:Spring |
| **Enduring Understanding:** Patterns that occur in sequences and probability events create connections between numerical patterns and functional relationships. | | | |
| **Standard and**  **Related Concept** | **Performance Objectives** | **Essential Questions** | **Resources**  Ch=Chapter  L=Lesson | **Collaboration and Integration** |
| **Strand 1: Number and Operations**  **Concept 3: Estimation** | ***PO 1. Recognize the limitations of estimations by assessing the amount of error resulting from estimation and determining whether the error is within acceptable tolerance limits.*** | What is the difference between a permutation and a combination?  What is the difference between a series and a sequence?  What is the difference between arithmetic and geometric sequences?  What pattern does the binomial theorem produce? | Ch 11.1 – 11.4  Ch 11.6 – 11.7 |  |
| **Strand 2: Data Analysis, Probability, and Discrete Mathematics**  **Concept 1: Data Analysis** | ***PO 2. Compare data sets using graphs and summary statistics, including variance and standard deviation, with or without technology.*** |
| **Strand 2: Data Analysis, Probability, and Discrete Mathematics**  **Concept 2: Probability** | ***PO 1. Apply probability concepts to calculate the probability of events and to make informed decisions in practical situations***  ***PO 2. Use the principal characteristics of the normal distribution to estimate probabilities.***  ***PO 4. Determine the conditional probability of an event given that another event occurs, decide if two events are dependent or independent, and determine the probability of an event given the probability of the complementary event.*** |
| **Strand 2: Data Analysis, Probability, and Discrete Mathematics**  **Concept 3: Systematic Listing and Counting** | ***PO 1. Use the binomial theorem and Pascal’s Triangle to solve problems.***  ***PO 2. Demonstrate the connections between the binomial coefficients, entries of Pascal's triangle, and combinations.*** |
| **Strand 3: Patterns, Algebra, and Functions**  **Concept 1: Patterns** | ***PO 1. Analyze sequences and series and use them in modeling, including***   * ***explicit formulas for nth terms,*** * ***sums of finite arithmetic series, and*** * ***sums of finite geometric series.***   ***PO 3. Distinguish between explicit and recursive formulas and convert between them, making good choices about when to use which.***  ***PO 4. Solve problems involving recursion.***  ***PO 5. Use and interpret sigma notation to represent summation.***  See ***Structure and Logic*** portion of the curriculum document for connections to higher order thinking and teaching for understanding rather than teaching solely for skill development. |

**Key Concepts: Key Vocabulary:**

TOPIC:

**Further Topics in Algebra**

**Examples:**

Sequence

Arithmetic Sequence

Common Difference

Geometric Sequence

Common Ratio

Pascal’s Triangle

Binomial Theorem

Permutation

Combination

Factorial

Probability

Arithmetic sequences are related to linear equations while geometric sequences are related to exponential equations.

Order matters for permutations, order does not matter for combinations.

The Binomial Theorem and Pascal’s Triangle are useful tools in expanding binomials.

**Enduring Understanding:**

Patterns that occur in sequences and probability events create connections between numerical patterns and functional relationships.

**Essential Question(s):**

What is the difference between a series and a sequence?

What is the difference between arithmetic and geometric sequences?

What is the difference between a permutation and a combination?

What pattern does the binomial theorem produce?

A student body council consists of a president, vice-president, secretary/treasurer and 3 representatives at large. Three members are to be selected to attend a conference.

How many different such delegations are possible?

How many are possible if the president must attend?

Evaluate the series.



Find the sum.



Find  for the arithmetic sequence with 

Expand using Binomial Theorem.



Find the sum

